African Journal of Emergency Medicine (2012) **2**, 97–102

African Federation for Emergency Medicine

African Journal of Emergency Medicine

www.afjem.com
www.sciencedirect.com

The state of emergency medicine in the United Republic of Tanzania

B.A. Nicks [a,*], H.R. Sawe [b], A.M. Juma [b], T.A. Reynolds [c,d]

[a] *Department of Emergency Medicine, Wake Forest School of Medicine, Winston-Salem, NC, USA*
[b] *Department of Emergency Medicine, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania, East Africa*
[c] *Department of Emergency Medicine, Muhimbili National Hospital, Dar es Salaam, Tanzania, East Africa*
[d] *Department of Emergency Medicine and Global Health, University of California, San Francisco, San Francisco, California, USA*

Received 8 March 2012; revised 8 May 2012; accepted 9 June 2012
Available online 20 July 2012

KEYWORDS

Emergency medicine;
Casualty;
Tanzania;
Development

Abstract The United Republic of Tanzania is the world's 31st largest with a 2009 census reported a population of 43.7 million people, with more than 80% of the population in rural areas. Considered a low income country, Tanzania is recognized for its ethnic and unparalleled biodiversity. Medical resources are limited and HIV/AIDS, malaria, and respiratory diseases disproportionally impact morbidity and mortality. In addition, the incidence of non-communicable diseases (NCDs) is rising, with diabetes, hypertension, and vehicular injuries accounting for the greatest increases. Currently at most hospitals, emergency patients are cared for in Emergency Centres (ECs) staffed with rotating personnel who are neither trained nor equipped to provide complete resuscitative care, but dedicated emergency care training projects are emerging. The first Emergency Medicine residency in the country was initiated in 2010 and will produce its first graduates in 2013. In 2011, a dedicated Emergency Nursing curriculum was introduced, and the Emergency Medical Association of Tanzania (EMAT), the first Emergency Medicine professional society in the country, was formed and ratified by the Ministry of Health. EMAT has been given a mandate to develop feasible initiatives for the dissemination of emergency care training to district and sub-district facilities. However, significant gaps exist in the capacity for emergency medical care including deficits in human resources, essential equipment and infrastructure – concurrent issues that EMAT must address within its development strategy.
© 2012 African Federation for Emergency Medicine. Production and hosting by Elsevier B.V. All rights reserved.

* Corresponding author.
E-mail address: bnicks@wfubmc.edu (B.A. Nicks).
Peer review under responsibility of African Federation for Emergency Medicine.

Production and hosting by Elsevier

2211-419X © 2012 African Federation for Emergency Medicine. Production and hosting by Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.afjem.2012.06.002

Abstract D'après le recensement de 2009, la République-Unie de Tanzanieest le 31è pays du monde avec une population de 43,7 millions, plus de 80% de la population vivant en zones rurales. Considérécommeun pays à faiblerevenu, la Tanzanieestreconnue pour sesethnies et sabiodiversitéinégalée. Les ressourcesmédicalessontlimitéeset le VIH/SIDA, le paludisme, et les maladies respiratoiresont un impact disproportionnésur la morbidité et la mortalité. En outre, l'incidence des maladies non transmissibles (MNT) est en augmentation, le diabète, l'hypertension, et les blessuresliées aux accidents de la route connaissant la plus grande augmentation.
Actuellementdans la plupart des hôpitaux, les casd'urgencesontsoignésdans les centresd'urgence par un personnel en rotation qui n'estniforméniéquipé pour fournir dessoinsintensifscomplets, mais des projets de formation spécialisés en soinsintensifsvoient le jour. Le premier cursus de médecined'urgence a étéouvert en 2010 et produirases premiers diplômés en 2013. En 2011, uncursusspécialisé de soinsinfirmiersd'urgence a étéintroduit, et l'Association de médecined'urgence de Tanzanie (EMAT), la première sociétéprofessionnelle de médecined'urgencedans le pays, a étécréée et ratifiée par le ministère de la Santé. L'EMAT a pour mandat de développer des initiatives faisables de diffusion de formations en soinsd'urgencedans les installations de district et sous-district. Cependant, des lacunessignificatives existent en termes de capacité des soinsmédicauxd'urgence, notammentunmanque de ressourceshumaines, d'équipementsspécialisés et d'infrastructures – des problèmes concomitants quel'EMATdoit affronter dans le cadre de sastratégie de développement.
© 2012 African Federation for Emergency Medicine. Production and hosting by Elsevier B.V. All rights reserved.

African relevance

- Tanzania joins several other African countries with development of Emergency Medicine training.
- Development in Tanzania benefitted from the shared experiences of other African countries.
- Global collaborations have assisted with the current development of the specialty.
- Limitations in infrastructure and health care resources remain a challenge.

What's new

- Emergency Medicine (EM) is a new, rapidly developing specialty in Tanzania.
- Collaborating with the Ministry of Health's care mandate helped with EM development.
- The first Emergency Medicine Specialist graduating class will occur in 2013.

Introduction

Essential to the understanding of ongoing Emergency Medicine development in Tanzania is an appreciation for the countries diverse geopolitical makeup. Formed in 1964 when Tanganyika (having gained independence from Britain in 1961) and Zanzibar merged, Tanzania continues to move forward as a young democracy. Located in equatorial Sub-Saharan Africa, it encompasses nearly 950,000 square kilometers and is bordered by the Indian Ocean, Kenya, Uganda, Rwanda, Burundi, Democratic Republic of Congo, Zambia, Malawi, and Mozambique (Fig. 1). The geography of Tanzania includes coastal plains, a central plateau, and highlands in the south and north. The current population is estimated at greater than 44 million and average life expectancy is 52 years.[1] The low life expectancy impacted by high rates of

Fig. 1 Tanzania. *Source:* www.wikipedia.com; Accessed 21.11.11.

Table 1 Tanzanian top ten causes of death, all ages.

Causes	Deaths (×1000)	Death %	Years of life lost (%)
All causes	583	100	100
HIV/AIDS	166	29	29
Respiratory infections	67	12	13
Malaria	56	10	12
Diarrheal diseases	31	6	6
Perinatal conditions	24	4	5
TB	18	3	3
Cerebrovascular disease	16	3	1
Ischemic heart disease	14	3	1
Syphilis	11	2	2
Road traffic accidents	10	2	2

Source: WHO: Death and DALY estimates by cause, 2006.

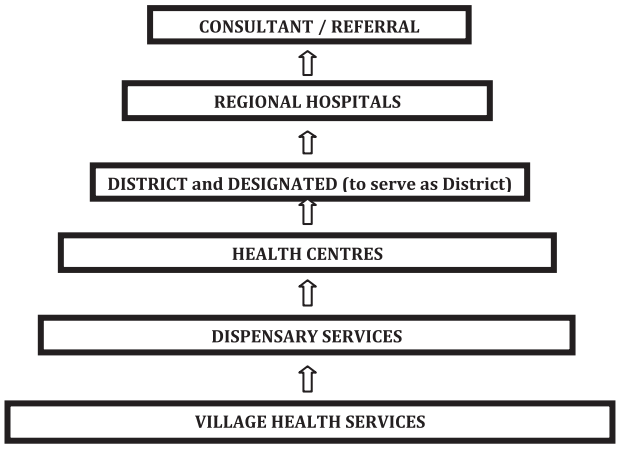

Fig. 2 Tanzanian Healthcare System.

poverty (>35% below the poverty line), infectious disease (including HIV, malaria, tuberculosis, plague, typhoid, and schistosomiasis), trauma, and poorly controlled chronic medical conditions (see Table 1). The presumed prevalence of HIV infection is around 7%, however there are sub-segments of the population where the prevalence is as high as 44%.[2] The infant mortality rate is 69.3 per 1000 (199th of 224 countries worldwide).

Like many African countries, Tanzania faces significant challenges in the provision of health services noting a substantial shortage of health care workers and a burgeoning increase in the need for HIV/AIDS management. Additional factors, such as low wages, workplace hazards, and limited continuing professional education contribute to poor conditions for health workers of all cadres and create barriers to the retention of highly skilled providers.[3] While difficult to quantify, the migration or 'brain drain' of trained health workers from poorer countries to richer ones continues to exacerbate the already weak health systems in countries like Tanzania.

Given the increasing medical challenges facing the public system, the number and utilization of private health care facilities in Tanzania are increasing, although the actual proportion of private facilities is not well-documented. While both public and private health care facilities are available, health care access and utilization vary greatly across economic groups and geographic regions.[4,5] In general, the public health system functions in a pyramidal structure established in the early 1990s, with the vast majority of health care interactions occurring in the lower tiers (Fig. 2).

1. Village Health Service

This is the lowest level of health care delivery in the country. Usually each village health post has two village health workers chosen by the village government among the villagers and given brief training.

- Provides basic preventive services

2. Dispensary Services

This is the second stage of health services. Each dispensary cares for 6000–10,000 people and supervises all the village health posts in its ward. Basic outpatient services are typically provided by a nurse.

3. Health Centre Services

A Health Centre is expected to oversee the care of approximately 50,000 people, the population of one administrative division. Typically oversees a group of dispensaries and coordinates outpatient care across them up to the District Hospital.

4. District Hospitals

The district is a very important level in the provision of health services in the country. This may include government or other designated hospitals that contract with the government to provide services. This includes outpatient, inpatient and limited surgical capacity – with limited Emergency Centre (EC) care.

5. Regional Hospitals

Regional Hospitals offer an expanded range of care and more subspecialty services than district facilities. These services vary greatly among regions and may include early limited EC care integration.

6. Referral/Consultant Hospitals

This is the highest level of hospital services in the country. Presently there are four referral hospitals in Tanzania: the Muhimbili National Hospital which covers the eastern coastal

zone; Kilimanjaro Christian Medical Centre (KCMC), which serves the northern zone; Bugando Medical Center in the western zone; and Mbeya Hospital in the south. In addition, Muhimbili National Hospital is designated as the National Hospital, and receives referrals from all the regional hospitals and the other three referral hospitals. Of note, emergency medical care, even at referral hospitals, remains highly variable in structure and quality.

Emergency Medical Care

Emergency Medicine is a relatively new concept in Tanzania. In hospitals equipped with an acute care area, most are not currently equipped for acute care management, lack staff with dedicated emergency training, and serve primarily as triage areas for inpatient versus outpatient care rather than acute care areas. A recent study by Penoyar et al., provided an overview of the surgical care capacity for 16 regions of Tanzania demonstrating substantial deficiencies in infrastructure, human resources, life-saving and disability preventing interventions and equipment.[6] While indirectly related to emergency medical care, it helps to further understand the current barriers to the provision of life-saving services in Tanzania.

While the development of an integrated emergency medical care system is multifactorial, several isolated projects are ongoing in regional care centers to develop dedicated emergency care facilities staffed with trained emergency providers, but at this time, the collaborative project between Muhimbili National Hospital, the Ministry of Health, and Abbott Fund Tanzania, is the only known full capacity project providing EM residency training and specialized emergency nursing training.

Additional EM projects are ongoing in varying scale throughout the country. Bugando Medical Center (BMC), in coordination with the Catholic University of Health and Allied Sciences and sponsored by the Touch Foundation, is in the process of redesigning the Emergency Centre at BMC, while integrating acute care and emergency medicine concepts into the medical school curriculum and care practices within BMC. Mission-based hospitals, such as Selian Lutheran Hospital, in collaboration with Hennepin Medical Center, have been integrating EM concepts into their Emergency Centre and healthcare practice.[8] KCMC, in collaboration with Duke University, has begun to integrate training in acute care management and EM practices into their Casualty Centre.[9] While these do not account for all ongoing EM initiatives, these examples represent a larger trend within Tanzania.[7–9] As EM relates to the aforementioned care pyramid in Tanzania, there are ongoing efforts to integrate basic EM concepts into layperson care standards for the two lowest parts of the pyramid, standardized basic EM training to include resuscitation, early intervention and transfer at the District and Regional Levels, and increased EM-trained providers at the Referral Centers as a bottom-up/top-down approach to unifying care.

Pre-hospital Care

Emergency care in the pre-hospital setting is highly region specific and includes both public and private sector involvement. In general, most facilities provide basic transportation in an ambulance (without routine care interventions) for patients being referred to a higher level of care, but there is no standardized training or certification for transport personnel. Patient care enroute is usually limited to continuing those interventions initiated at the referral facility. In general, pre-hospital or ambulance transport services are underresourced, understaffed and poorly equipped in terms of equipment and training.[10] In addition, transport of ill patients is often delayed due to 'bundling' of as many transfer patients as possible, and limited infrastructure (e.g. poor roads, traffic, limited pre-transfer communication) increase transport times. Additional challenges relate to the geographic diversity and limited infrastructure within and between regions of Tanzania making patient transportation to higher levels of care a continued challenge.

Hospital-based Care

Most hospitals in Tanzania currently have an acute care area staffed with rotating personnel with limited emergency care training and few resources to deliver resuscitative care. Acute care areas often serve primarily to direct patients to other care locations within the larger facility. In the past few years, there has been an increasing emphasis on the development of better-equipped EC sites with dedicated personnel. As mentioned above, several hospitals are developing facilities that provide acute care management, but there is a lack of uniformity in the approach to emergency care and a lack of coordinated development of care systems, training programs, and implementation planning.[6]

Emergency Medicine Specialty Development

The development of emergency medicine as a specialty in Tanzania has been greatly facilitated by other African organizations, such as the Emergency Medicine Society of South Africa (EMSSA) and the African Foundation of Emergency Medicine (AFEM), as well as the early development of specialist training programs in other African countries, such as Ethiopia and Ghana. In 2009, Muhimbili National Hospital, the country's largest public hospital, inaugurated Tanzania's first full capacity emergency medicine department in collaboration with the Ministry of Health and Abbott Fund Tanzania. Later that year, adoption of the Emergency Medicine Residency Curriculum was approved by the Muhimbili University of Health and Allied Sciences; the first class of eight Emergency Medicine residents began training in 2010 and are expected to graduate in 2013. The curriculum was adopted and modified from both the existing curriculum for Emergency Medicine training in South Africa and resources from the International Federation for Emergency Medicine.

Concurrent with the EM residency project, a specialized emergency nursing curriculum was developed and implemented at Muhimbili National Hospital. Through the development of this program, it is hoped that a national emergency nursing training program will be established to initially provide all referral centres with a standardized level of nursing care within the developing emergency care system. Further program development, acceptance, and implementation outside of Muhimbili remain a work in progress.

In addition, while we know of no certified Tanzanian EM specialists currently working full time in the country, there

are several Tanzanian physicians undertaking EM training in South Africa, with aspirations to return in the near future to further pioneer the development of this specialty in Tanzania. What is postulated going forward would be a phased EM residency development in four main regions of Tanzania (Dar es Salaam, Arusha/Moshi, Mbeya, Mwanza) centered at select Referral Centres over the next 10-15 years. The initial Tanzanian EM specialists would be divided and serve as the leaders at these centres – supported by the Ministry of Health, respective Referral Centre and any established international EM collaborative. It is believed that as these sites further develop the EM specialist concept, concurrent bottom-up education, development, and unification of resource-appropriate EM application from the Village Health Services up to the Referral Centre will greatly enhance emergent healthcare delivery.

The Emergency Medicine Association of Tanzania (EMAT)

Soon after the establishment of the Muhimbili Emergency Centre, Muhimbili providers developed and launched the Emergency Medicine Association of Tanzania (EMAT). This is a professional association of emergency medicine physicians and nurses with active involvement in emergency medicine practice and is open to dedicated emergency providers of all cadres. It was founded in January 2011 and successfully registered by the Registrar of Societies of Tanzania in May 2011. At the time of registration, the association had over 40 active members and has been well received by the Ministry of Health. The main objectives of EMAT are to pioneer the expansion of emergency medicine in Tanzania; to promote and improve emergency care through teaching, research and education; to promote the speciality of emergency medicine; to advocate for emergency care in Tanzania; to generate funding for the accomplishment of the above; and to lobby on behalf of its members for the promotion of and maintenance of the profession. Currently EMAT is undertaking several projects such as Primary Trauma Care (PTC) training, basic and advanced life support training, and Emergency Medical Services (EMS) development. In addition, data are being collected of current hospital Emergency Centre and emergency medicine capacity and training on a national level.

In order to meet the mandate of the Ministry of Health to "facilitate the provision of basic health services that are of good quality, equitable, accessible, affordable, sustainable and gender sensitive", the development of the specialty of emergency medicine is crucial.[6] For the development of Emergency Medicine to succeed, the Ministry of Health must support the establishment of training programs and faculty teaching positions as well as outreach programs to rural, district, and regional care facilities and clinics. In addition, the development of a regulatory body for specialty designation, examination, oversight and regulation will be an essential step going forward. As with any specialty in its infancy, clarity in mission and vision, dedication to improving the quality of care, and continued advocacy are paramount. Many of the challenges facing EMAT are similar to those of the Emergency Medicine Society of South Africa (EMSSA) during its infancy; something EMAT leadership recognizes and seeks council. Also, development of a long-term, unified strategy to guarantee EM as an attractive specialty, both financially and personally, is being formulated.

Conclusion

Emergency Medicine is a relatively new, yet rapidly developing specialty in Tanzania. With ongoing collaboration and mentorship from healthcare organizations and specialists in Emergency Medicine from around the world, Tanzania is poised to take a leadership role in the development of Emergency Medicine across Africa. Although most facilities in Tanzania are not currently equipped to consistently provide dedicated emergency care, initiatives are well underway that will soon produce doctors and nurses with high-quality specialized emergency training who will serve as leaders in the development and dissemination of emergency care in Tanzania and Africa at large.

Appendix A. Short answer questions

Test your understanding of the contents of this original paper (answers can be found at the end of the regular features section)

1. Life expectancy in Tanzania is challenged due to:
   a. High rates of poverty
   b. Infectious disease
   c. Trauma
   d. Chronic medical conditions
   e. All of the above

2. In Tanzania, the provision of health services is limited by:
   a. Health care worker shortages
   b. Increasing HIV/AIDS
   c. Workplace hazards
   d. Increasing demand for health care
   e. All of the above

3. The professional organization associated with emergency medicine in Tanzania is:
   a. Tanzanian Emergency Medicine Association (TEMA)
   b. Emergency Medicine Association of Tanzania (EMAT)
   c. Tanzanian Emergency Medicine Society (TEMS)
   d. None of the above

References

1. *World Development Indicators and Global Development Finance – Google Public Data Explorer*. <http://www.google.com/publicdata/explore?ds=d5bncppjof8f9_&met_y=sp_pop_totl&idim=country;TZA&dl=en&hl=en&q=tanzanian+population/>; 2012 accessed 28.02.12.
2. *Tanzania National Website: HIV/AIDS in Tanzania*. <http://www.tanzania.go.tz/hiv_aids.html#Prevalence%20of%20HIV%20Infection/>; 2010 accessed 03.05.10.
3. *WHO: The health worker shortage in Africa*. <www.who.int/bulletin/volumes/87/3/08-051599/en/index.html/>; 2012 accessed 28.02.12.
4. *Unicef – Tanzania*. <www.unicef.org/infobycountry/tanzania_statistics.html/>; 2010 accessed 28.04.10.
5. *Ministry of Health and Social Welfare, Tanzania*. <http://www.moh.go.tz/>; 2011 accessed 22.05.11.
6. Penoyar T, Cohen H, Kibatala P, et al. Emergency and surgery services of primary hospitals in the United Republic of Tanzania. *BMJ Open* 2012;**2**:e000369.

7. *Ministry of Health and Social Welfare, Tanzania.* <http://www.moh.go.tz/Roles.php/>; 2011 accessed 22.05.11.
8. *International Emergency Medicine training in Tanzania improves care in Minnesota.* <http://www.anjnews.com/content/international-emergency-medicine-training-tanzania-improves-care-minnesota/>; 2012 accessed 28.02.12.
9. *Duke Emergency Medicine – International Emergency Medicine Fellowship.* <http://emergencymedicine.surgery.duke.edu/education-and-training/fellowship-programs/iem-fellowship/>; 2012 accessed 28.02.12.
10. Razzak JA, Kellerman AL. Emergency medical care in developing countries: is it worthwhile? Policy and practice. *Bull World Health Org* 2002;**80**:900–5.